

# The American Biology Teacher

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EDUCATION  
LIBRARY

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### A Message to Biology Teachers

It is generally conceded that it is practically essential in present-day teaching to keep posted on the current literature in any particular field. Yet no busy teacher possibly could read all of the important papers in the original even if the many journals published throughout the world were available. It was for this reason that a group of prominent biologists organized *Biological Abstracts* back in 1926. Now this cooperative undertaking is abstracting and indexing annually more than 30,000 significant contributions to the biological sciences.

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BIOLOGICAL ABSTRACTS  
University of Pennsylvania  
Philadelphia 4, Pa.

# The American Biology Teacher

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## Using the Group-Unit Method Democratically

MRS. RICHARD L. WEAVER

Teacher, 407 Stacy Street, Raleigh, North Carolina

Adapted from a paper presented as part of a panel discussion on "Adapting Science Instruction to Meet Community Needs," before one of the Joint Sessions of Science Teaching Societies of the AAAS in Philadelphia, Dec. 28, 1951. The author details the philosophy, methods, and some of the results of her use of the Group-Unit Method in science instruction and certain other subject-matter areas in the seventh and eighth grades at Garner and Chapel Hill, North Carolina.

I will not pretend that either Group or Unit work is new. I would rather contend that they are yet untried by many teachers. Our educators say that these practices are carried out quite generally and very well in most of our primary grades but, from that point on, they fade out and teachers turn to working page by page in textbooks. The result is that the enthusiasm for learning is lost, education becomes dry and boring to both teacher and pupil, becoming increasingly less real and worthwhile, and less interesting as we move upward in grade level.

By the time students have reached high school level they should be able to use the methods of research, and should have well-organized habits of study. I heard just a few days ago of a superior college freshman who was very much unprepared and surprised when faced with her first term paper. Preparing reports from many sources was a new ex-

perience for this superior student. Preparing a bibliography, keeping notes, and a long-time assignment were new. Why should they be? A mother, who is a friend of mine and who has a Doctorate in education, bought a set of encyclopedias for her son. She said he went through the first eight grades and almost through high school before he had even one assignment involving research or which required his encyclopedias.

All too often our pupils are well trained to do only a certain few pages or problems which the teacher plans, the teacher assigns, and the teacher checks. Pupils are seldom given any responsibilities. Those who suffer most from such methods are our superior and exceptional children. They have lost their desire to learn by not being given responsibilities and by not being challenged to think. They are satisfied with far less than their best efforts and have become "problems."



Photo by Margaret Fisler, Courtesy North Carolina Wildlife Resources Commission

Unit project activities in the study of animal life, such as these, can be assembled to make an attractive and informative exhibit.

What is a Unit? How does it fit into the time pattern? I like to think of a Unit as a comprehensive piece of work inclusive enough to consume anywhere from two to six weeks of school time. The time spent will vary greatly according to the time structure of the particular school, or the interest span of the group. It may vary from group to group according to age and ability. We find that, for us, in junior high school science, six-week Units seem to work out very nicely. The use of every educational tool that the teacher and pupils can think of, which will contribute to answering the problems set up by the group and leader as goals for the Unit, will be needed. The Unit will be set up so that it will be a core. In the progress of the Unit, the children will be con-

cerned with English as it arises as a normal part of the work, they will have many occasions to do arithmetic and spelling, they will write letters for information, and so on.

The first step in the Unit will be a brief outline of the plan of study. This also will be the organization plan for class notebooks. For seventh grade, during the Unit, pupils will make a complete factual outline. In science they will collect a list of laws, principles, and generalizations. We call these "Things to Remember." The Unit will include as many experiments as everyone can find which explore various problems studied in the Unit. It will include oral and written reports. For these reports, research in many books will have been done. It will also include all of the

miscellaneous material that can be collected which pertains to the Unit—pictures, diagrams, graphs, clippings from magazines and newspapers, recent pamphlet material, state bulletins, etc.

The teacher and students will use as many real materials, actual products, samples, collections and so on as possible. Down the road from our school is an establishment where tombstones are made. The class walked down to learn how rocks are used to make memorials. Each one came back with samples of various types of granites and marbles and the names of the places where these rocks were quarried. Materials used will include up to date information and materials that are a real part of the living of the people of the community where

you teach. The teacher will direct children to chapters in their textbooks which pertain to the Units being studied.

In our democratic American life, it is becoming increasingly necessary for people to learn to work together. We are teaching courses in some of our schools called *Human Relations*, but do we allow students in schools to live together? I believe I could safely say that in most schools we still follow the antiquated practice of lining our children up in rows and teaching them, with much emphasis, to be quiet. Yet there is no place in life, except in the military services, where they will ever be lined up in rows and, except in a library, there are few places where they will work in quiet. In large offices they will have to work with others



Photo by Margaret Fisler, Courtesy North Carolina Wildlife Resources Commission

Seventh and eighth grade pupils planted corn and lima bean seeds and compared the growth of plants having different seed structure.

moving around, and they will have to learn to compute and concentrate amid the clatter of office machines and typewriters. Yet in schools it is very convenient for the teacher to have children stay put in rows and all be quiet.

If we are to better prepare our pupils for life, our schools should use life methods so that year by year our pupils learn better to get along with others. This will carry over to help solve many of our current social problems. If pupils learn how to get along with others, perhaps we will have fewer divorces, fewer mental cases, fewer lonely people, and fewer problems of many kinds in schools and out.

How can this be done in the classroom? The Unit method carried out in groups is one method. Chairs or desks can be arranged so that pupils can work together. Any arrangement that fits the furniture and equipment and space you have can be used. Circles can be used, if you have space, chairs facing each other. This gives an amazing amount of extra space in which work tables can be placed. I asked for about ten folding chairs. These are used by panel groups during discussions, by quiz groups, by those doing art work, and so on. I heard one educator say that he talked to a screwed-down teacher who taught screwed-down children in screwed-down desks. Of course it does not improve the situation if we unscrew the desks, and then put chalk marks on the floor in the places where the chairs must be kept.

Progressive education received much unfavorable reaction partly because too many teachers jumped all conventional traces and failed to organize their work once their conventional patterns were broken.

Group and Unit work require cooperative planning. The overall plan of work for the year needs to be made co-

operatively. In order to satisfy supervisors, principals, and parents, we began by saying, "Here are suggestions for Units in the State Course of Study. Here are Units suggested by the author of our textbook. Here is what another author thinks. This is a big order for us, but perhaps we can think of a way to organize all of this material, and maybe we will have time for some choices of your own too." There are two large branches of science. We need to see that some of our Units are chosen from each field. There are physical science Units and natural science Units. When I spoke to one teacher about how children choose and plan, she said, "Oh, I wouldn't dare do that. They would choose to jitter-bug or read comics!" But they don't. We need to have faith in our young people, and confidence in their ability to choose, plan, and accept responsibilities.

The teacher may continue setting up the Unit by saying, "There are several ways of choosing Units and several ways of arranging our groups. Let's talk about the possible ways, then decide which plan we will use this time; another time we may want to do it another way."

Some possibilities for Unit organization are:

1. The whole class chooses a Unit. The groups take different divisions of the Unit.
2. Perhaps a class is divided into four groups. Each group can work on a different Unit.
3. Usually the children suggest that they organize groups of varying sizes according to interests.

After the groups are formed, each group chooses a leader and a secretary. Each chooses a process observer. Once I heard a process observer say, "Mr. Chairman, am I talking too much?"

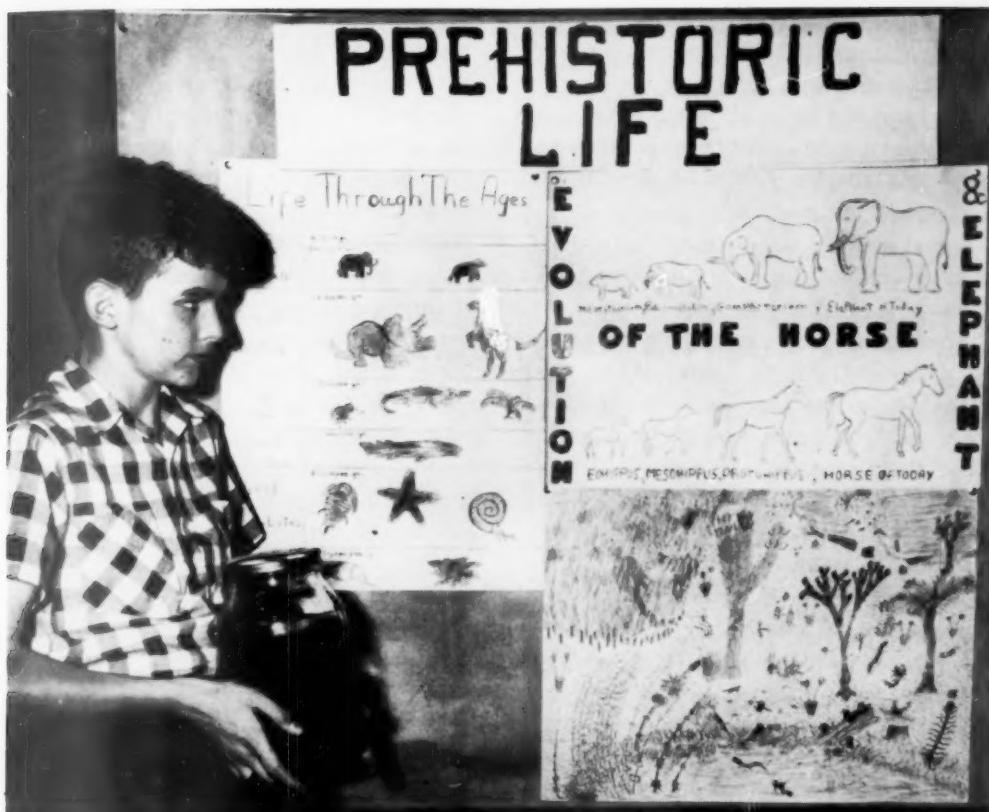


Photo by Margaret Fisler, Courtesy North Carolina Wildlife Resources Commission

Original posters, showing life in prehistoric times, are worth-while group Unit activities.

When the pupils in a group are organized, they make a brief outline of their plan of work. They spend several class periods searching for materials they can use, portioning out topics. They set up a list of requirements for the Unit and Notebook. These are usually more comprehensive than the teacher would make.

Most of the work is done during class periods. They have their plans; now they need work time in which to carry them out. The teacher is free to assist groups, work with individuals, help find materials, get supplies, make suggestions, and keep in touch with what groups and individuals are doing. Members of groups may make a frieze, posters, display tables, or arrange collections, prepare bulletin boards, and so on. The

group decides how it will prepare a notebook, cooperatively or individually. A bibliography is required.

Our English book has a Unit on how to prepare reports, make outlines, and bibliographies. We discussed this chapter in relation to our Unit work, and found that we had done much more than was suggested by having made all of these things real parts of our Unit work. If children are to use many books and many other types of materials to supplement their textbooks, provision must be made for these things to be available for use in the classroom. Teachers must collect materials and make them available to pupils. If all of us show our administrators the values of this type of work, perhaps schoolrooms will gradu-

ally become better equipped for our use. We need more shelf space, work tables, and folding chairs for many uses.

By working in small groups, teachers can make use of a small number of books of a kind, single copies, and pamphlet and magazine material. In one school, where I taught, the teacher and a committee decided to clean up the book-room. They put a sign on several shelves of books saying, "These are to be discarded: if you want them, take them." Among the books were salesmen's sample copies of many new books; since there was only one copy of each, they were going to throw them out. Such books often make wonderful additions to the room library.

Before I move on to the next step, I might anticipate some of your questions. Do you do that work all day? Groups can plan their time. Also we find that we almost never have two days alike. In general we plan about an hour's work period in science, then do our arithmetic in the conventional way, then we may work in social science, or we may have another work period in the afternoon. For two years, my group work was done in a departmental set-up, and in science we used this method exclusively. Pupils worked in groups only when they were in their science class. By using both methods, the children are not deprived of any of the values of formal education, and they have to become adaptable.

After the work period is over, the groups are ready to present their findings to the class. They work out different ways in which to make their presentation. A group working on Conservation decided to dramatize the enforcement of game laws. They had a hunter and a game warden in their play. Several groups have put on quiz programs. Some groups divide up their material so that each person in the group is a member of a panel. Some groups close with

a test which they give to the whole class. They show any art work which they have done, they do experiments, and tell about field trips. An eighth grade group did a Unit on Multiple Births. They arranged to bring in three sets of twins from other classes in the school for their presentation. On the same day another group demonstrated an electrical color-changing device which they borrowed from the University.

Sometimes they read orally to the class. There is a real audience situation. The teacher can reserve the privilege of expanding on parts of the work presented, suggest other demonstrations, follow up with additional information, ask questions, and so on. The presentation will stimulate further study and arouse the interest of other pupils to make a choice for another Unit.

At the close of each group presentation there is an evaluation. The work will constantly improve as the children learn to constructively criticize their own work and the work of others. Each group leader asks for favorable comments, suggestions for improvement, and corrections. The Notebook is used for collecting material which will be used for the presentation. Notebook work becomes vital.

After that part of the evaluation, we evaluate the work of individuals in the groups. The children gather in their groups to give their estimates of grades. The teacher can make use of this in making her grades. This helps all pupils to get a true realization of all the factors which enter into fair grades. They realize that abilities vary. I remember one group leader bringing a student to me saying, "We decided that everyone should get three examples from magazines, and he says he doesn't have a single magazine in his home."

An important part of Unit work is real experience. Field trips to industrial

concerns, local establishments, the dairy, college departments (if you are in a college town), museums, filter plants, and so on can be organized.

How about transportation? If the children want to do a thing badly enough they will help find a way. We were studying transportation and communication and planned an all-day field trip. Four mothers helped all day with the group. There were 37 children and four mothers. A committee was chosen to do the planning. I was fortunate to have a husband who could help us. He took the planning committee to the various places and helped them work out a time schedule for the trip. They took notes and presented their findings to the class. There was much pre-planning. Just before we were to leave school, I said, "Is there anything else anyone can think of?" One boy said, "Have we notified the Cafeteria Director that we are not eating here today?" We had not done so. Children can be very thoughtful and helpful, when given real problems, and when they know they have the confidence of adults in their abilities to contribute.

In summary, I would like to list some of the values of Unit and Group work done on a democratic basis: (1) Children work to answer problems. (2) They share material. (3) They learn democracy by living it. (4) They can work on various levels. (5) These methods develop leadership. (6) Homework grows out of classwork. (7) Art work is correlated with classwork. (8) They bring in resource people. (9) They do research. (10) A few copies of one kind of book can be used. (11) There are opportunities for experiments with little equipment. (12) Children share in setting up requirements and share in choosing Units. (13) Interest is the basis for learning. (14) Children talk about school work with others of

their own age. It is thrilling to me to hear them discuss whether a rock is sedimentary or metamorphic or igneous; also to have them say, "May we have the hydrochloric acid to test this?" (15) It gives children an opportunity to move about and to learn good behavior because it is a necessity that they move about. (16) They learn personal independence; also independence of the teacher. They seek aid from their classmates. (17) You have a true audience situation. (18) Oral reading is purposeful. (19) Notebooks have a real purpose; they are in constant use. (20) Leaders take responsibility to see that all in the group contribute; leaders and groups set up the requirements. (21) Music, English, spelling, and arithmetic are correlated within Units, yet we do not neglect formal work in these subjects. (22) Groups make display cases and keep bulletin boards. (23) Every individual has many opportunities to contribute to the class in many ways. (24) There is much carry-over of democratic ideas into other school work, and into the home and community. For example, one mother I knew said to her husband, "I've invited a lot of children in for a party." The father asked her what she was going to do with them. She said, "I'm not going to worry about that; they have such good training in planning in school that they know how to take care of themselves." (25) Many children ask guest speakers in to help with classwork. One girl asked a missionary from Jamaica to talk to us about his trip to Brazil. (26) Children bring tools, equipment, supplies, volunteer transportation, etc. They almost do things in spite of you. A terrarium was built, and a bird-feeder. Another child brought a huge roll of newsprint for art work. (27) Project work, experimenting, dramatics and so on are a continuous component part of Unit and

Group work. A teacher I talked with said, "Yes, they do projects. We got through our text, and the last two weeks at the end of the year the students enjoyed doing projects." (28) Children tackle Units, topics, and projects for which neither you nor they know all the answers; you learn together. Last year an eighth grade group decided to study roots. I said, "Oh, I don't think you can find enough material." They said there was more than they could use. They made a set of posters on black paper, drawn in white ink, that was excellent. They had also found actual specimens of tap roots, fibrous roots, adventitious roots, and so on. (29) Children have a sense of belonging. This is especially good for the children with less ability. (30) Other students help those with less ability. (31) It seems to me that when children have the privileges of democracy in the classroom, it would be very unlikely that they would listen to the teachings of any foreign power that might try to undermine our democracy.

### REPORT ON CONSERVATION PROJECT

The Executive Committee for the Conservation Project has been delighted at the favorable response to the project in all parts of the country and at the number of people who are volunteering to assist with it. Many people have learned of it through announcements made by organizations with representatives on our Advisory Committee.

Twenty-four states were represented at the Conservation Work Conference held in Philadelphia as a part of our annual meeting December 27-31, 1951. Meetings of state groups were held and some planning started for committee work in each of the states represented. Suggestions were made for improving the criteria which will be used in locating examples of outstanding conservation teaching.

State chairmen have been appointed in all forty-eight states. The state chairmen are organizing state committees in each state to conduct the conservation project and to fit the committee work into other conservation education efforts.

As rapidly as state plans can be developed and the descriptions of various techniques are collected, work conferences will be set up to go over the materials and edit them for publication and to plan for follow-up activities. Work conferences in 1952 are tentatively scheduled as follows:

**Southeast**—Emory University April 18-19 in conjunction with meetings of Southeastern Biologist's Association under the chairmanship of George Jeffers of Farmville, Virginia.

**Northwest**—Corvallis, Oregon, in June in conjunction with the meetings of Pacific Division AAAS under the co-chairmanship of Leo Hadsall, Fresno, California, and Ruth Hopson, Eugene, Oregon.

**Northeast**—Ithaca, N. Y., on September 10-11 in conjunction with meetings of American Institute of Biological Sciences under the chairmanship of E. L. Palmer of Ithaca, N. Y.

**Midwest**—Saint Louis, Mo., December 28-31 in conjunction with the AAAS and the annual meeting of NABT under the chairmanship of Richard L. Weaver, Project Leader, Raleigh, N. C.

At least two other regional conferences are contemplated to take care of the Southwest and Rocky Mountain states.

The National Conservation Committee welcomes help from any interested persons or organizations. Those wishing to help should contact any of the following people:

### NATIONAL CONSERVATION COMMITTEE

The executive committee of eight members to coordinate the project are:

Richard L. Weaver, Chairman, P. O. Box 5424, State College Station, Raleigh, N. C.  
E. Laurence Palmer, Fernow Hall, Ithaca, N. Y.  
Lydia Elzey, 311A Burrowes Building, State College, Pa.

Howard Michaud, 824 N. Main Street, West LaFayette, Indiana  
 Leo Hadsall, Fresno State College, Fresno, California  
 John Harrold, 110 East Hines Street, Midland, Mich.  
 George Jeffers, Longwood College, Farmville, Virginia  
 Betty Lockwood Wheeler, Mt. Pleasant, Michigan

#### REGIONAL AND STATE CHAIRMEN

Region I—Kent Warner, 2 Howe St., New Haven, Conn.  
 Maine—Gunnar Lytakinen, Bangor High School, Bangor, Maine  
 New Hampshire—Mildred Gutterson, Keene High School, Keene, N. H.  
 Vermont—Jean Simpson, Brassknocker Farm, East Craftsbury, Vt.  
 Massachusetts—Helen Ross, State Teachers College, Fitchburg, Mass.  
 Connecticut—Laurence Wilson, Wethersfield H. S., Wethersfield, Conn.  
 Region II—Joe Horvath, P. O. Box 273, Mahanoy City, Pa.  
 New York—Theodore Eckert, Fernow Hall, Cornell Univ., Ithaca, N. Y.  
 Pennsylvania—Donald Hoffmaster, State Teachers College, Indiana, Pa.  
 New Jersey—Matthew Brennan, State Teachers College, Jersey City, N. J.  
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 Indiana—Prevo Whitaker, School of Education, Univ. of Indiana, Bloomington, Indiana  
 Illinois—Robert Smith, DeKalb Township High School, DeKalb, Ill.  
 Michigan—Betty Lockwood Wheeler, Mt. Pleasant, Mich.  
 Wisconsin—Bernard Wievel, Wisconsin State College, Stevens Point, Wisc.

Region IV—Chairman, Darrell Lantz, Iowa State Teachers College, Cedar Falls, Iowa  
 Minnesota—Gordon L. Bender, State Teachers College, Bemidji, Minnesota  
 Iowa—Emery Will, Iowa State Teachers College, Cedar Falls, Iowa  
 Missouri—Sam P. Hewitt, State College, Warrensburg, Mo.  
 Kansas—Don Q. Milliken, Kansas State Teachers College, Pittsburg, Kansas  
 South Dakota—Norris W. Paulson, Jr. H. S., Pierre, S. D.  
 North Dakota—Henry Scheerer, Wheelock, N. D.  
 Nebraska—Adrian Fox, Box 713, Lincoln, Neb.

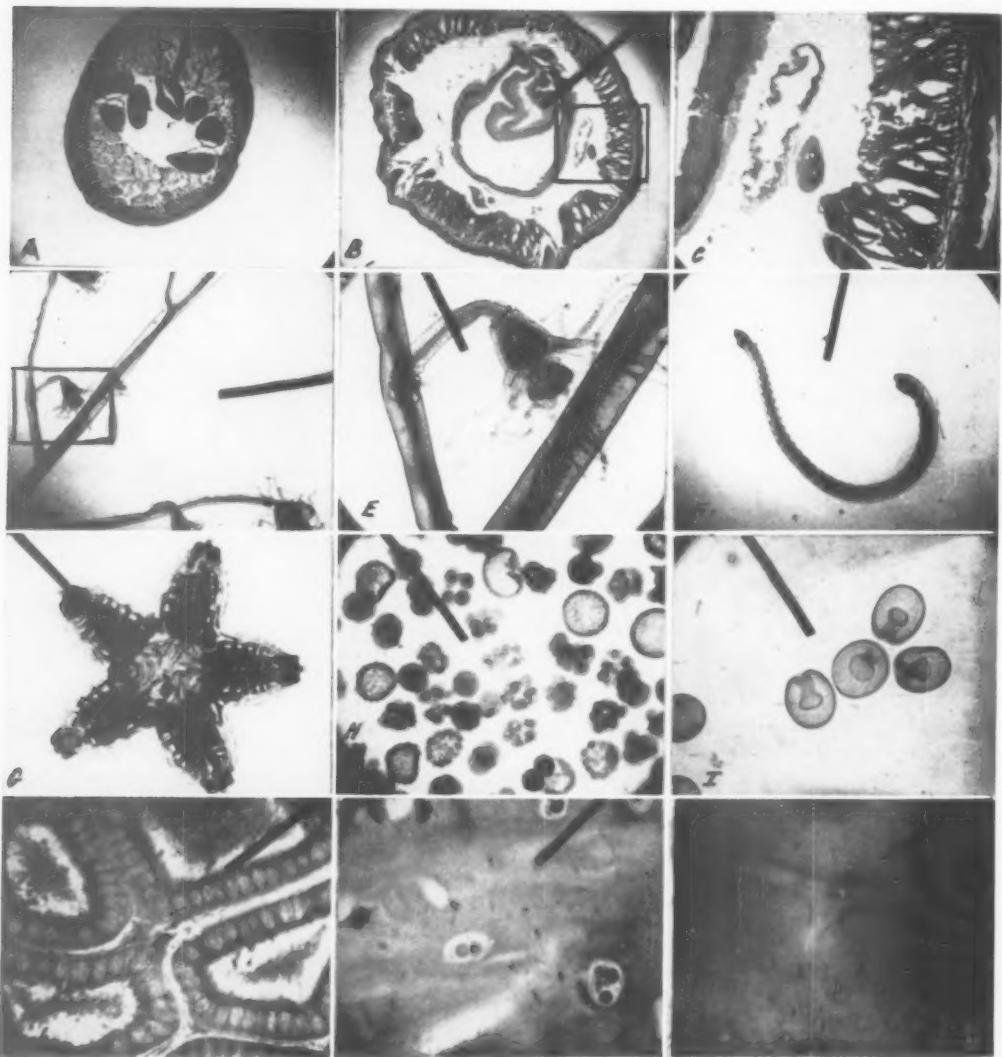
Region V—Chairman, Charles E. Packard, Box 7, Star Route, Ashland, Va.  
 Delaware—Ruth Cornell, 1806 Van Buren St., Wilmington 223, Delaware  
 Maryland and Washington, D. C.—Byron

Ashbough, P. O. Box 1510, State Office Bldg., Annapolis, Md.  
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 Archer O. Richardson, co-chairman, Va. Dept. of Educa., Richmond, Va.  
 West Virginia—James Handlan, Potomac State School, Keyser, W. V.  
 North Carolina—Ray Derrick, co-chairman, Appalachian State Teachers College, Boone, N. C.  
 S. E. Duncan, co-chairman, N. C. Department of Public Instruction, Raleigh, N. C.  
 Kentucky—Douglas Terry, Harlan H. S., Harlan, Ky.  
 Tennessee—John Bailey, East Tennessee State Teachers College, Johnson City, Tennessee  
 Region VI—Chairman, James Burdette, U. S. Soil Conservation Service, Spartanburg, S. C.  
 Georgia—Susan Brown, Atlanta City Schools, Atlanta, Ga.  
 South Carolina—David Stoney, S. C. Dept. of Educa., Columbia, S. C.  
 Florida—Malvina Trussell, Florida State University, Tallahassee, Fla.  
 Arkansas—Luther Tanner, Alma High School, Alma, Ark.  
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 W. H. Caston, co-chairman, Alabama State College, Montgomery, Ala.  
 Mississippi—Hendrix Dawson, Mississippi Game and Fish Commission, Jackson, Miss.  
 Louisiana—  
 Region VII—Chairman, Howard Weaver, Texas Forest Service, College Station, Texas.  
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 Texas—B. B. Harris, Dean, North Texas State College, Denton, Tex.  
 Arizona—Martin Mortensen, Arizona State College, Tempe, Ariz.  
 New Mexico—Howard J. Dittmer, Uni. of N. M., Albuquerque, N. M.  
 Region VIII—Chairman, Clifford D. Knapp, Gallatin County High School, Bozeman, Montana.  
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 Montana—George Gloege, East Montana College of Education, Billings, Mont.  
 Nevada—S. S. Wheeler, 29½ Keystone, Reno, Nev.  
 Wyoming—Jean Cooper, Senior H. S., Cheyenne, Wyo.  
 Colorado—E. C. Harrah, Colorado State College of Education, Greeley, Colo.  
 Idaho—Michael Throckmorton, Idaho Fish and Game Dept., Boise, Ida.  
 Region IX—Chairman, Leo Hadsall, Fresno State College, Fresno, California.  
 California, Leo Hadsall, Fresno State College, Fresno, Calif.  
 Oregon—Ruth Hopson, Extension Division, Eugene, Oregon.  
 Washington—

## Photography in Biology

Biology teachers agree that photography can be an important teaching aid, that a photograph can sometimes save many words of explanation, that pictures can often clear up ideas that cannot be expressed in words at all, that pictures are attention-getters, that picture taking is a good hobby, and so on and on. But the great majority of papers submitted

to *The American Biology Teacher* are not accompanied by pictures. Perhaps this is partly due to the nature of the topics presented, but in many cases the author simply did not think of a picture in connection with his presentation. Sometimes the editor asks for one or more pictures before sending the manuscript to the printer; the author then



From *Photography Through the Microscope* by Lt. Theodore Downs, then a member of the Medical Administration Corps, Army Air Forces, published in November, 1944, Volume 7, page 37. Photos taken through a standard laboratory microscope, with an ordinary Argus camera.



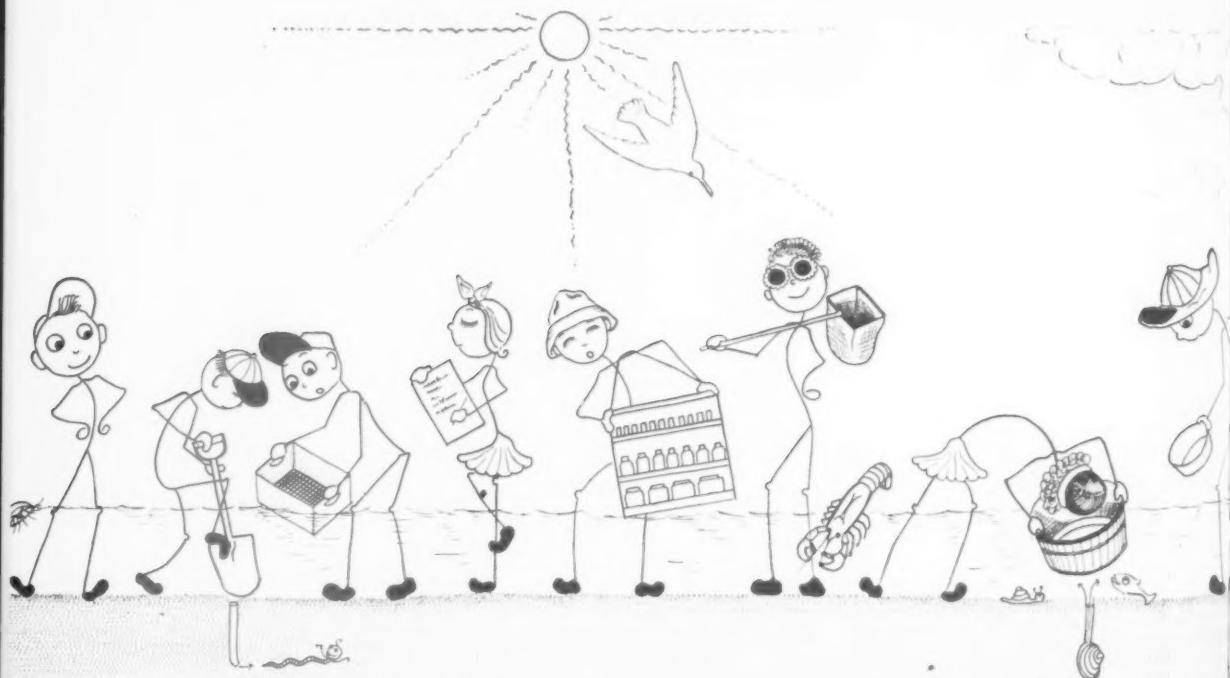
From *Conservation Series, Unit VI, The Introduction of Natural Resource Planning into Our Schools of Today* by Richard L. Weaver, Educational Director, Audubon Nature Center, Greenwich, Connecticut, published in January, 1947, Volume 9, page 112. Photo by Louise Neal. This photo was used earlier, in an article by Miss Neal—*An Eight-Year-Old Looks at His World*, October, 1944.



From *A Biology Club in Fun* by Zane Laidlaw, then a student in Post Intermediate School, Detroit, Michigan, published in March, 1942, Volume 4, page 173.



From *An Introduction to the Identification of Plants* by Verna M. Weeman, Senior High School, Albany, Oregon, published in May, 1948.



A      B      C      D      E      F      G

From *Field Trips With a Long-Range Purpose* by Mary D. Rogick, College of New Rochelle, New Rochelle, New York, published in January, 1945, Volume 7, page 80. Cartoon drawn by the author. Sometimes a drawing does better than a photograph.



From *Conservation Series, Unit VII, Conservation Education in Public Schools* by Adrian C. Fox, United States Soil Conservation Service, published in January, 1948.

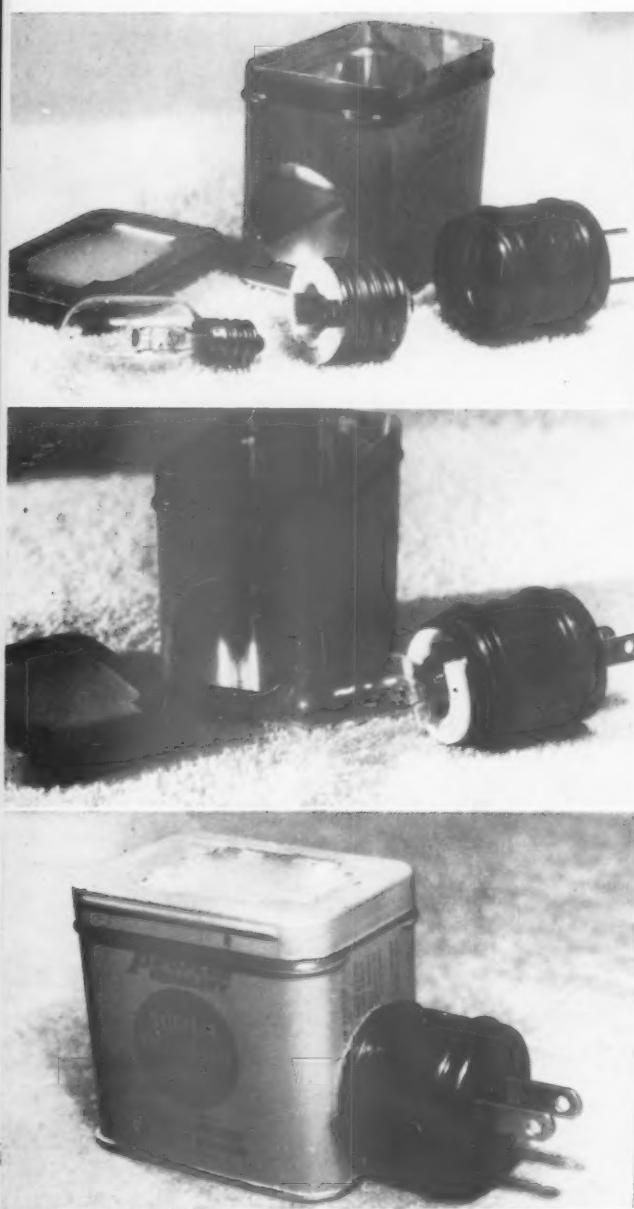
finds or makes some pictures. These, in themselves, improve the article. There may be further improvement, because the author may revise his article by making careful and pointed references to the pictures.

In order to suggest some possibilities, *The American Biology Teacher* is repeating herewith a variety of photographs, each of which has appeared in an ABT article. In each case the article for which the photograph was originally used is specified.

There is another reason for running these pictures at this time. Beginning with the October issue *The American*



From *Practical Suggestions for Field Activity* by Robert C. McCafferty, Wadsworth High School, Wadsworth, Ohio, published in February, 1946, Volume 8, page 111. Photo by Malcolm Forgrave.



From *Laboratory Aids*, a combined group of articles by two authors. "A Sub-Stage Lamp" by Rev. John W. Baechle, C.P.P.S., St. Joseph's College, Collegeville, Indiana, published in May, 1946, Volume 8, page 203.

*Biology Teacher* will use a photograph on the front cover. To be acceptable as for a cover picture a photograph must be of good quality, so that it will make a good half tone engraving. And more important, it must portray a subject of interest in biology teaching; in other words, it must not only tell a story, but also tell it well. It is hoped that the accompanying pictures will suggest some possibilities and that readers will submit samples of their own products for future cover pictures.

#### DOUBLE TRAY SLIDE HOLDER

The working drawing of the slide holder featured in the February issue was omitted because it could not be reduced to suitable size. Mr. Sanders writes that he has a few copies of the drawing available to those who desire them. Write Edwin F. Sanders, 1330 Russet Street, Racine, Wisconsin.

(EDITOR'S NOTE: Although Mr. Sanders did not mention it, the editor suggests that when you write for the drawing, you enclose a dime for mailing and handling.)

#### FREE TEACHING MATERIALS OFFERED BY OUR ADVERTISERS

American Optical Co.—Scholar's Microscope wall chart

General Biological Supply Co.—Service leaflets

Quivera Specialties Co.—*Care of Pet Amphibians and Reptiles*

Visual Aids, Inc.—Microprojection manual

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W. M. Welch Scientific Co.—*A Living Biological Laboratory*

Ward's Natural Science Establishment—*Bulletin*

Denoyer-Geppert Co.—16mm. sound film—How Anatomical Models Are Made

## Resume of a Brief Urging the Repeal of a Law Relating to the Teaching of Health in the Schools of New York State

BRIEF PREPARED BY THE NEW YORK ASSOCIATION OF TEACHERS  
OF THE BIOLOGICAL SCIENCES AND THE NEW YORK ASSOCIA-  
TION OF CHARMEN OF THE BIOLOGICAL SCIENCES

The teaching of health and the establishment of health habits has been one of the cardinal objectives of education for many years. In 1942 the New York State Regents passed a regulation requiring the teaching of health in the high schools of the State. Bulletin 1371, "The Health Teaching Syllabus for the Junior and Senior High Schools," was "designed to present the material for the basic course work in health required by the Regents."

In 1950 the New York State Legislature passed a law which adversely affects the teaching of health in the schools of the State. Under this law, "Subject to rules and regulations of the Board of Regents, a pupil may be excused from such study of health and hygiene as conflicts with the religion of his parents or guardian." (Subdivision 5 in the State Education Law, Section 3204, Chapter 135, S. 1/50.) The amendment was sought by the Christian Science Church.

Dr. Lewis A. Wilson, Commissioner of Education, has already approved the exemption of the children of parents or guardians of the Christian Science faith from instruction in the units of disease prevention and control and has indicated specifically which parts of the syllabus are to be omitted in their case. His directive further provides that "pupils exempt from instruction in the specified areas are to be provided opportunity to study under school supervision." Evaluation of achievement for pupil credit purposes is to be done in such a manner as not to penalize pupils who have been exempt from specified units of study, and required sections of the Regents examination and State Scholarship examinations, will be so constructed as not to penalize pupils who have been excused from the study of specified units of the syllabus.

Under this ruling those pupils who are excused from instruction in the units of disease prevention and control will get no instruction in such things as the building up of resistance to disease; the understanding of current health programs, both public and private; measures used to prevent the spread of communicable diseases; the importance of heart disease, cancer, diabetes, diphtheria, typhoid fever, tuberculosis, and infantile paralysis; the role of insects in the transmission of disease; the relation of the sanitary control of water and food to public health; war conditions and the problem of disease control and prevention; and the work of such eminent figures as Florence Nightingale, Louis Pasteur, Walter Reed, Robert Koch, and Alexander Fleming.

It is obvious from the mere listing of these topics that the law will deprive exempted children of invaluable information. Moreover, since the directive states that the required sections of both the Regents examination as well as the State Scholarship examinations will be so constructed as not to penalize those pupils who were excused from instruction, all children, whether Christian Science or not, will be subject to the de-emphasis and virtual elimination of these topics that will result from this modification of the examinations.

This law and its method of implementation are so alarming from the point of view of the protection of the health of the individual and the community and from the point of view of the preservation of the State itself and its public educational system, that a widespread demand for its repeal is in order.

The sectarian censorship of public education created by this law, and the precedent it establishes for further control of public

education by special groups, both undermine one of the chief functions of public education; to be a unifying force, providing a common heritage of knowledge for all children. By allowing a special group the right to exempt its children from a part of the common and agreed upon heritage, the law creates two dangers to our public education: (1) It permits any group to set itself up as the judge of what shall or shall not be included in the course of study for its children, and, (2) it establishes the precedent for similar action by other groups. Now every group, whether bound by religious or racial or national-origin ties, or even by some special interest such as vegetarianism, may with equal justification, claim exemption for its children from those portions of instruction in the public schools to which it is unwilling to subscribe. The correctness or popularity of the opinion is no longer the point, for few indeed hold the idea of Christian Scientists about disease and the evidence is definitely against the soundness of their views. Any group now has the privilege as a right since it has been accorded to another group.

Not only health education but the entire public school curriculum is now threatened with limitations and a piecemeal cutting up, if different groups vie with one another to alter public education to suit their individual purposes. This skeletonizing is foreshadowed in an opinion by Mr. Charles A. Brind, Jr., Counsel of the State Education Department, in a memorandum to the Governor relative to this law. He said:

"If, as a matter of law, members of the Christian Science Church are excused from instruction because it is alleged that such instruction conflicts with their views it is anticipated that other requests for similar legislation will be presented. For instance, the Mohammedans have already insisted that they should be excused from instruction on all Fridays because that conflicts with their religion. We have had innumerable requests from followers of various cults who do not want to participate in physical training because of alleged misgarding of students or because the parents objected to their children associating with other children who are garbed as children are required to be in order to participate in these experiences."

This law menaces not only public education but all educational effort because it establishes the principle that a student is to be excused from contact with ideas which at the time he does not hold or which his parents do not believe.

It is absolutely necessary in the course of education to discuss trends and opinions which are either unpopular, unproven, or even outmoded, in order to give a background for an understanding of the subject. While taking up the causes of the Civil War, a teacher may give the attitude of the South toward slavery. It is not expected that students will immediately become proponents of this doctrine, or that the children of Negro parents will stalk out of the room in indignation. Today, a person cannot understand modern life unless he knows the meaning of such concepts as fascism, communism, and totalitarianism. Only in this way can he really appreciate the blessings of democracy and freedom. It is not the experience of teachers that children embrace these foreign philosophies merely because they are mentioned in discussion.

Similarly, public educators can reasonably expect a child of Christian Science parents to sit with his classmates and learn as a matter of cultural background what years of painstaking research have taught us about disease. No teacher will insist that a child alter his religious convictions or assent to the teaching. Yet those entrusted with public education cannot permit the erection of numberless cordons sanitaires around aspects of culture objected to by this or that group, especially aspects that the overwhelming majority of the citizens feel justified in believing and supporting.

The law physically separates students on religious lines within the school building, and thus constitutes a blow at public education. Although it is the intention of the Commissioner that this be done in a way to avoid causing embarrassment to any pupil or parent, the fact remains that when the subject of disease is taken up the child of Christian Science parents will be physically separated from his classmates. He will have to sit apart in another room doing some equivalent work. He is thus separated physically and spiritually from his fellow students, and both he

and they will suffer mutual alienation.

In the future, if other groups as well as the Christian Scientists have to receive the same tactful treatment, it is obvious that feelings of uncertainty and bitterness may be aggravated. It is obvious that parents will rightfully resent the intrusion into public education and into the education of their own children of such organizational and cultural rearrangements.

The law threatens the physical safety of the community by exempting some children from instruction that will enable them to act intelligently to safeguard the health of the community.

It is not reasonable for any group to seek or obtain permission to impose on public education its purely private opinions concerning facts which the citizens accept wholeheartedly and it is sheer tyranny when its disbelief is permitted to endanger the health program of the entire community. Since no group may claim exemption from obedience to the sanitary code no group may be excused from learning the reasons for its existence.

The law weakens both military and civilian defense. The United States, and probably other nations as well, are spending thousands of dollars in highly important research relative to bacteriological warfare and defense against such warfare. Every American citizen must be prepared to understand the relation of germs to disease so that he may be able to give full cooperation to the military and civilian defense arms against possible bacteriological or virus attack. Those individuals who neglect or ignore this knowledge handicap us all.

The law constitutes a threat to the health education and health consciousness of all children at a time when Civilian Defense and first aid measures are of paramount importance. Questions on disease control and prevention will not appear on the parts of the Regents examinations and the State Scholarship examinations which all students have to take. Experience shows that topics which are not covered on these examinations will be minimized in class. Teachers are bound to keep these examinations in mind while preparing their students for them and what

will not appear on the test will not receive emphasis in the school room. Thus, the law, beginning with the Christian Science students, will tend to deprive all students of adequate instruction in this vital field.

The State has always reserved the right to supersede the beliefs of individuals in cases where those beliefs would result in danger to the community. This right of the State has been upheld by the Courts in several cases. In the case of Prince vs. Massachusetts, the attitude of the Supreme Court was that in acting to guard the general interest in the well-being of a child the State as *pars pro patria* may restrict the parent's control by many requirements despite claims of religion or conscience. It gave as examples compulsory school attendance, vaccination, and the prohibition of child labor. The following sentence from the opinion of Judge Rutledge is apropos:

"The right to practice religious freedom does not include liberty to expose the community or the child to communicable disease or the latter to ill health or death."

In view of all the foregoing, we respectfully urge and recommend that this 1950 section of the Education Law be repealed, and that you do all in your power to work toward this end.

The New York Association of Teachers of the Biological Sciences and the New York Association of Chairmen of the Biological Sciences will strive for the repeal of this law, and to advance such action, will help all persons and organizations similarly engaged.

Brief prepared by a joint committee of the two associations;

E. BLECHMAN	J. METZNER
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Resume submitted by Marion Richter.

The next issue of *The American Biology Teacher* will appear in October. Manuscripts for this issue will be sent to the printer the latter part of August. News, notes or other short items can be placed in the dummy which is sent to the printer on September 15.

## Nature Study and Biology Field Trips for Blind Pupils in Elementary, Junior High, and Senior High Schools

ARTHUR H. BRYAN

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Field trips in conjunction with nature study, biology, and geology are important enrichment devices if they can be arranged. They constitute an integrating method of instruction, particularly in applying the principles of biology to actual experiences. Field and shore trips are worth while, not only from the standpoint of natural history interest, but there are pleasure and health objectives also for both seeing and sightless pupils.

Blind pupils may readily learn to identify trees by manipulation of the leaves, barks, buds, trunks, stems, seeds;

also trees with perfect flowers, such as chestnut, tulip, poplar, etc. Their keen olfactory senses help them to identify plants with characteristic odors such as the spruce, pine, sassafras, fir, persimmon, etc. One group of blind students, farmed out to Baltimore City College for higher studies, recently made a collection of leaves on their Resident Blind School campus. They were able to identify several of them tactually, and some through olfactory sense perceptions. Leaf imprints were also made in plaster of Paris casts for future use, and braille-labeled for identification.

Seeing pupils take an interest in bringing in botanical and zoological specimens for examination and identification in the classroom and laboratory, and the blind similarly may be encouraged to participate in this extra-curricular activity. They may be able to find pine cones, locust buds, acorns, horse chestnuts, etc., on their own campus, if they have a guide to help them. Home-garden projects may be worked out by blind pupils, with interesting, utilitarian, and pleasing avocation possibilities. The author's *Biology Interest Questionnaire* tabulation tends to verify this interest in field and campus trips.

Everybody likes to see or feel things grow, and the blind are no exception. The sight-handicapped pupils in the writer's classes were given, as a project, "Seed Germination," with viable seeds to germinate in various ways at home or in the Resident Blind School. Tactual growth observations were then made from day to day.



Photo by R. F. Porter

Tactual and olfactory study of plant forms by blind pupils.

The sight-handicapped enjoy a fragrant flower garden, and apparently acquire considerable pleasure from various sweet odors, and the humming of pollinating bees. They like to pick their own fruit, so it is a good idea to help them to tactually identify the common nuts, fruits, tubers, pomes, gourds, etc., and verify their findings first by odor and later by taste. These gardening projects may hardly be undertaken by the blind pupils alone, and usually require careful supervision. However, if any form of gardening work such as floriculture, horticulture, vegetable raising, or fruit culture becomes a pleasure, or the means of an added interest in their limited spheres of existence, then the project is worth while.

Bird calls are interesting to the blind biology pupil. If he can recognize the songs of the various birds, his pleasure is considerably increased, especially if he can name these birds and knows something of their habits. A preliminary study of the songs of birds can start in the classroom where, with a portable or regular phonograph, these excellent records—distributed by the Columbia Talking-Machine Company—can be played: *Bird Calls; A Day With Birds; An Evening With Birds; Birdland Melodies*.

The list of bird calls, which may be recognized and identified, and which may also be taught via the phonograph and then in the country under the teacher's direction, include the robin, veery, wood thrush, whip-poor-will, Baltimore oriole, chewink, cardinal, thrasher, wren, blue-bird, blackbird, finch, blackbilled cuckoo, screech owl, mourning dove, and southern mocking bird. Identification of frogs and toads by their notes, and of domestic animals by their cries, may be included if farm visits are arranged. Insect and bird symphonies may be passed up by people



Photo by R. F. Porter

Blind pupils learn and have fun too with a human skeleton and a model of an earthworm.

with sight, but become another beautiful contact with the world of nature to the blind through their intensified auditory (hearing sense).

Blind pupils may be taught to identify many birds and animals by their characteristic sounds. The birds may be classified, named, and described according to their seasonal appearances in a particular district; then the blind, with their keen auditory senses, may be asked to listen for them. Some blind pupils do not appear to enjoy this study very much, but it may be made interesting to them. Tactual study of some of the more common birds, using stuffed or live specimens, may be undertaken with type studies of the owl, eagle, duck, chicken, sparrow, sea gull, etc., in order to support field trips and observations which may come later. If such specimens are procurable, special attention may be given to the bills and feet of each type.

Bird skeletons, with their thin and porous bones, are valuable adjunets to tactful bird study in bringing out flight adaptations. The human skeleton, and models of vertebrate and invertebrate animals, are also important teaching aids.

Those who have been blind over a long period of time have the auditory acuity particularly well developed, and it becomes a protection to them in case of an emergency. For example, a blind person should know by the bark or growl of a dog whether the dog is friendly or not. The writer once saw a blind boy receive a nasty shock when a pugnacious rooster, without any warning whatsoever, flew up into his face and tried to peck at him. The blind boy heard the beat of the rooster's wings near him, and turned his face away from the bird, throwing up his hands just as a seeing person would do, and in so doing protected his face. This boy had been around domestic animals for several years, having lived for some time on a farm. He was prepared for the emergency when he heard the fluttering of wings near him. In rambles or hikes into the country, woodlands, farms, fields, or streams, it is worth while for blind students to learn to distinguish between friendly and hostile animals. Field trips may include the audition of noises of insects such as crickets and locusts, with cautions for bees, wasps, hornets, etc.

Some blind pupils may have opportunities to visit a swamp, lake, or seashore. The questionnaire indicates that blind students like simple studies of marine life, because so many forms are adapted to tactful observation. They like to handle and manipulate all kinds of molluscan shells. One blind boy, a former blind student at Baltimore City College, has made a hobby of collecting

seashore shells. The blind students at Atlantic City go with their instructors to the beaches, and make collections of marine biological specimens. Marine trips may include tactful observation and collections of marine botanical specimens, including the many kinds of seaweeds. The marine zoological opportunities for tactful study of the invertebrates under a competent instructor include sponges, bryozoans, corals, star fish, sea urchins, sea cucumbers, sand dollars, cray fish, scallops, crabs, shrimp, conches, oysters, clams, whelks, sea squids, etc. The marine vertebrates, suitable for tactful observation, include most fish; however, extreme caution in tactful studies of live rays, stingarees, dog fish, sculpins, etc., should be exercised.

On field trips and visits to zoological gardens, aquaria, and natural history museums, the blind need not be excluded, although they probably feel their handicap unless seeing students and instructors take special interest in the blind and make the trip valuable to them through oral descriptions.

In the zoological gardens, the blind may learn many animal notes, cries, howls, and odors. The splash of the seals and polar bears in the water call for a description of these aquatic mammals. The blind pupils are particularly interested in the rattle of rattlesnakes, and this noise is listened to intently as a protective measure and compared with the chirruping of crickets and locusts. Recently the writer demonstrated a collection of preserved and live snakes to his classes. Two blind children keenly enjoyed playing with live garter snakes in the laboratory. Later, when a three-foot long pet king snake was placed in their hands with instructions as to how to hold its neck, they actually derived amusement and pleasure as the snake

wriggled and twisted in their hands. When seeing confreres applauded their bravery, the blind youngsters got their supreme biological thrill.

The blind hear people laughing at the primates, and the monkeys' antics that occasion the laughter may be described to the blind pupils for their amusement too, particularly if the monkeys' cries are interpreted along with their actions. Signs on museum specimens—DO NOT TOUCH—should not apply too stringently to the blind. Usually the Curator or Attendant, if approached beforehand on the subject of tactful study, will give sympathetic help to these handicapped pupils.

Tactile observations of fossil plants and animals on geological field trips may be of interest. Crinoids, fossil foraminifera, bryozoans, corals, the fossil Venus flower basket, ostracods, and the shells of pectins, conches, nautiloids, chambered nautilus, fossil bivalves, molluscoidea, ammonites, barnacles, and trilobites are tactually interesting to the blind. Vertebrate fossils of many paleontological animals are available in museums, colleges, science academies, and even in some high school collections. Blind resident schools may build up a permanent geological collection of local fossils through kindly donations or field trip findings.

Paleobotanical specimens of ferns, cycads, and horsetails in anthracite coal and slate are tactually interesting to blind high school pupils. They may also feel the rock strata and have typical igneous, metamorphic, and sedimentary rocks indicated to them, particularly if fossils are present in the latter. Lichens and mosses, growing on rocks or walls, may prove interesting as tactful evidence of plant growth under difficult natural handicaps and environmental factors which are unfavorable.



Photo by R. F. Porter

Handling of live turtles, snakes, and alligators can be very real experiences to the blind.

The author's *Biology Questionnaire* on choice of teaching methodology, given to seven classes to determine their choice of the most interesting type of lesson, gave field place to field trips, second to teacher demonstrations, and third place to sound movies. The field trip, from a pupil's viewpoint, is an important and pleasing method of instruction in biology and nature study, irrespective of grade level. The blind pupils indicated the same choices as their seeing confreres. They like field trips too, and don't we all?

#### NEW ASSOCIATE EDITOR

MISS LYDIA ELZEY, long-time active member of NABT, is a new associate editor. She is specifically in charge of articles and other contributions dealing with elementary education in biology. If you have something of interest in this field, send it to Miss Lydia Elzey, 311A Burrowes Building, State College, Pa.

## Where to Find Educational Films for Rental or Purchase

The arrangement of sources of educational films on biology has been made with the intent of giving wide coverage rather than to attempt to list all sources. No doubt important sources have been overlooked. It is assumed that anyone teaching in a large city school system having its own film library will know that source. However, such a view does not apply to rental libraries. Although the present list was compiled for the use of persons who have never tried to procure films, it should also be useful to anyone who is not widely acquainted with the possibilities.

Under the first heading of *general source list* have been included some names of actual distributors. Their catalogs help give a survey of the subject ranges and might be of value to a teacher making a first trial of educational films.

Very few books on Audio-Visual instruction have been included; the list is too long and their value too uncertain.

If any member of NABT has ideas about a biological film for which there is a need, but which has not been done, please write a script or outline. We hope to get cooperation from producers in anticipating the desires of teachers through giving the latter a chance to help decide what they want in a film before it is produced.

Note the code symbols in the general list:  
 @ items are rental and purchase, X items are purchase, o items are rental.

### General Source Lists

- @ Almanac Films, Inc., 516 Fifth Avenue, New York 18, N. Y. Catalog 16mm. Educational Films.
- American College of Surgeons, 40 East Erie Street, Chicago 11, Ill.
- @ American Film Registry, 24 East 8th Street, Chicago, Ill.
- o American Nature Association, 1214 Sixteenth St., N.W., Washington 6, D. C.
- Army Medical Illustration Service, Army Institute of Pathology, 7th St. and Independence Ave., S.W., Washington 25, D. C.
- o Association Films, Inc., 206 S. Michigan Ave., Chicago 3, Ill.

Atlas of Educational Films. Denoyer-Geppert Co., 5235 Ravenswood, Chicago 40, Ill.

Audio Film Center, 38 West 32nd St., New York 1, N. Y. Audio Film Center 1952 Catalog.

Bell and Howell Filmsound Library, 1801 Larchmont Ave., Chicago 13, Ill.

Biological Photographic Association, G. Graham Eddy, Chmn., Motion Picture Committee, Medical Illustration Div., Veterans Administration, Washington 25, D. C.

Boston University, School Public Relations and Communications, Division of Motion Pictures, Photography and Visual Aids, 84 Exeter St., Boston, Mass. Selected school subject lists. See biology, nature.

Boy Scouts of America, Public Relations Service, 2 Park Ave., New York 16, N. Y.

@ Brandon Films Inc., 1700 Broadway, New York 19, N. Y. Brandon International Film Classics, Catalog Motion Pictures, 16mm. sound or silent.

@ British Information Services, 30 Rockefeller Plaza, New York 20, N. Y.

Burton Holmes Films, Inc., 7510 N. Ashland Ave., Chicago, Ill.

@ Castle Films, Division of United World Films, Inc., 1445 Park Ave., New York 29, N. Y.

Children's Bureau, Federal Security Bldg., 3rd and Independence Ave., S.W., Washington, D. C. Child Health and Welfare, Source of Information on Non-Theatrical Films Relating Federal Security Agency, Social Security Administration.

@ Commonwealth Pictures Corporation, 729 Seventh Ave., New York, N. Y.

X Cornell Film Company—1951 Catalog. Cornell Film Company, 1501 Broadway, New York 18, N. Y.

o Coronet Instructional Films, 919 N. Michigan Ave., Chicago 1, Ill.

Dental Health Education Material. American Dental Association, 222 East Superior St., Chicago 11, Ill.

Department of Interior, U. S. Govt., Washington, D. C. Circular 150—Sources of Educational Films and Equipment.

Directory of 16mm. film sources. Radian Manufacturing Co., Chicago 8, Ill.

Directory of 2,002 16mm. Film Libraries. 30¢. Prepared by U. S. Office of Educa-

- tion. Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C.
- Directory of Film Sources. Victor Animatograph Corporation, Davenport, Iowa. Documentary Film, Paul Rotta, 1939, W. W. Norton & Company, Inc., New York, N. Y.
- The Dryden Press, New York, N. Y. *Audio-Visual Methods in Teaching*, Edgar Dale, 1946.
- @ Eastin Film Guidebook to Instructional Films: Secondary School Edition. Eastin Pictures Company, Davenport, Iowa.
- Eastman Kodak Company, Sales Service Division, Rochester 4, N. Y. *Visual Aid Sources*. Motion Pictures, Film Strips. From "Kodak Photo Notes."
- @ Edited Pictures System, Inc., 165 West 46th St., New York 19, N. Y.
- The Educational Film Guide. The H. W. Wilson Company, 950-972 University Avenue, New York 52, N. Y.
- Educational Film Library Association, Inc., The, Suite 1000, 1600 Broadway, New York 19, N. Y.
- o Educational Film Order-Catalog. Ideal Pictures Corporation, 65 E. South Water St., Chicago 1, Ill.
- @ Encyclopaedia Britannica Films, Inc., 1150 Wilmette Ave., Wilmette, Ill.
- Farm Film Guide. Business Screen Magazine, 150-152 E. Superior St., Chicago 11, Ill.
- Films and Education, Godfrey M. Elliott, Editor, Philosophical Library, New York, N. Y. 1948.
- Film Guide Library. Business Screen Magazine, Chicago 11, Ill.
- Films for Adult Education. Commission on Motion Pictures in Adult Education, 19 S. LaSalle St., Chicago 3, Ill.
- Films for Classroom Use. Teaching Film Custodians, Inc., 25 West 43rd St., New York 18, N. Y.
- Films for Television. Federal Security Agency, Office of Education, Washington 25, D. C.
- Films from Britain. British Information Services, 30 Rockefeller Plaza, New York 20, N. Y.
- @ Films Incorporated, 330 West 42nd St., New York, N. Y. Also 64 E. Lake St., Chicago 1, Ill.
- Film World, C. J. Verhalen, Jr., 6047 Hollywood Blvd., Hollywood 28, Calif. 16mm. film and Industry Directory.
- Fire Prevention Films. National Board of Fire Underwriters, 85 John Street, New York 7, N. Y.
- Food and Nutrition, Approved Films on. Health Council of Greater New York, 130 East 22nd Street, New York 10, N. Y.
- Girl Scouts, 155 East 44th St., New York 17, N. Y.
- 3,434 United States Government Films. Buy from Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C.
- International Academy of Medicine and Dentistry, Dept. of Audio-Visual Aids, 214 West 16th St., Topeka, Kans.
- Jam Handy Organization, 230 N. Michigan Ave., Chicago 1, Ill.
- Hoffberg Productions, 620 Ninth Ave., New York 18, N. Y. Hoffberg 1951-2 Releases. Interim Catalog of United Nations Films: Fall, 1951. United Nations Film Division, 405 E. 43rd St., New York, N. Y.
- American Medical Association, 535 N. Dearborn St., Chicago 10, Ill. Medical Motion Pictures, Reviews of—and List of Films Available through the Motion Picture Library, A.M.A.
- Mental Health Program, A list of motion pictures to be evaluated for use. Federal Security Agency, Public Health Service, National Institute of Mental Health, Washington, D. C.
- Modern Medicine, 84 S. 10th St., Minneapolis 2, Minn.
- National Association of Audubon Societies, 1000 Fifth Avenue, New York 28, N. Y.
- National Directory of Safety Films. The National Safety Council, Inc., 20 N. Wacker Drive, Chicago 6, Ill.
- @ National Film Board of Canada, Ottawa, Ontario, Canada, D.A.R. Moffatt, Director.
- National Tuberculosis Association, 1790 Broadway, New York 19, N. Y.
- Nursing Education, Selected Motion Pictures and Slidefilms for, Loretta E. Heidgerken, R.N., Audio-Visual Center, Indiana University, Bloomington, Ind.
- One Thousand and One—The Blue Book of Non-Theatrical Films. Educational Screen, 64 E. Lake St., Chicago 1, Ill.
- A Partial List of 16mm. Film Libraries. Federal Security Agency, Washington, D. C.
- Printed Cards for Motion Pictures and Film Strips. U. S. Office of Education. Buy from Supt. of Documents, Washington 25, D. C., or write Library of Congress, Card Division, for information.
- School Films. C. J. Verhalen, Jr., Publishing Co., 6047 Hollywood Blvd., Los Angeles 28, Calif.

- Scientific Film Company, 6804 Windsor Ave., Berwyn 1, Ill.
- Selected Educational Motion Pictures. American Council on Education, 744 Jackson Place, Washington 6, D. C.
- Sources of Visual Aids for Instructional Use in Schools—Pamphlet #80. U. S. Office of Education, Supt. of Documents, Govt. Printing Office, Washington 25, D. C.
- Sports, Physical Education and Recreation Film Guide, Business Screen Magazine, 150-152 E. Superior St., Chicago 11, Ill.
- o Teaching Films Custodians, Inc., 25 West 43rd St., New York 18, N. Y. Directory Film Libraries for Teaching Film Custodians, Inc.
- United Nations Department of Public Information, Division of Films and Visual Information, 350 Fifth Ave., New York 1, N. Y.
- o United Nations Information Office, 610 Fifth Ave., New York 20, N. Y.
- U. S. Government Films Catalog. Castle Films, 30 Rockefeller Plaza, New York 20, N. Y.
- @ United World Films, Inc., 1445 Park Ave., New York 29, N. Y. U. S. Government Films for School and Industry—16mm. Motion Pictures, 35mm. Filmstrips.
- The Utilization Digest. Bell and Howell Company, 7108 McCormick Road, Chicago 45, Ill.
- Vesco Film Library, Division of Audio-Visual Corp., 116 Newbury St., Boston, Mass.
- Victor Animatograph Corporation, Davenport, Iowa. Where to Get Films and Film Information—Leaflet, free.
- Wild Flower Preservation Society, 3470 Oliver St., Washington, D. C.
- The Wistar Institute of Anatomy and Biology, Woodland Ave. & 36th St., Philadelphia 4, Pa.
- World Pictures Corporation, 729 Seventh St., New York, N. Y.
- Yale University Press Film Service, 386 Fourth Ave., New York, N. Y.
- Y.M.C.A. Motion Picture Bureau, 347 Madison Ave., New York 17, N. Y.
- X Young America Films Inc., 18 East 41st St., New York 17, N. Y. Young America Catalog of Teaching Films. Young America Science Correlation Chart.

#### Periodicals

Educational and Recreational Guides, Inc., 172 Renner Ave., Newark 8, N. J. Audio-Visual Guide.

- Business Screen Magazine. Business Screen Magazine, Inc., 150-152 East Superior St., Chicago 11, Ill.
- Educational Screen. The Educational Screen, Inc., 64 East Lake St., Chicago 1, Ill.
- Film News. Film News Company, 13 East 37th St., New York 16, N. Y.
- Film World and Audio-Visual World. 6047 Hollywood Blvd., Hollywood 28, Calif.
- National Photo Dealer Directory Section.
- National Photo Dealer, 251 Fourth Ave., New York 10, N. Y.
- See and Hear. 150-152 E. Superior St., Chicago 11, Ill.
- 16 Millimeter Reporter, 1819 Broadway, New York 23, N. Y.
- Visual Review—Annual, free. Society for Visual Education, 1345 W. Diversey, Chicago, Ill.

#### Films—Purchase and Rental

(not mentioned above)

- Bray Studios, Inc., 729 Seventh Ave., New York 19, N. Y.
- California, University of. Educational Film Sales Dept., Los Angeles 24, Calif.
- Columbia University Educational Films, 413 W. 117th St., New York 27, N. Y.
- Indiana University, Bloomington, Ind. Audio-Visual Center.
- International Film Bureau, Inc., 6 N. Michigan Ave., Chicago 2, Ill.
- Iowa State College, Film Library, Ames, Iowa.
- New York University Film Library, 26 Washington Place, New York 3, N. Y.
- Rutgers Films, Rutgers University, Box 78, New Brunswick, N. J.
- United Nations Film Division, 405 E. 43rd St., New York 18, N. Y.
- U. S. Dept. of Agriculture, Office of, Information, Motion Picture Service, Washington 25, D. C.
- Washington, University of. Instructional Materials Center, Seattle 5, Wash.
- Wild Life Films Company, 6063 Sunset Blvd., Hollywood 28, Calif.

#### Films—Purchase Only

- McGraw-Hill Book Company, Text Film Dept., 330 W. 42nd St., New York 18, N. Y.
- Minnesota Dept. of Education, St. Paul, Minn.
- National Dairy Council, 111 N. Canal Street, Chicago 6, Ill.
- Nebraska, University of. Film Library, Lincoln 8, Nebr.

**Films—Rental Only**

- American Museum of Natural History, 79th & Central Park W., New York, N. Y.  
 American Nature Association, 1214 Sixteenth St., N.W., Washington, D. C.  
 Audubon Rental Film Library, 1000 Fifth Ave., New York 28, N. Y.  
 Farm Film Foundation, 1731 Eye St., N.W., Washington 6, D. C. (Some)  
 National Wildlife Federation, 3308 14th St., N.W., Washington 10, D. C.  
 Teaching Film Custodians Inc., 25 W. 43rd St., New York 18, N. Y.

**TIP OF THE MONTH**

Watch our classified advertising section for new teaching aids and materials in biology.

**MICROSCOPES**

New dark field microscopes combining the latest  $\times$  Spencer mechanical features with an improved illuminating system are announced by American Optical Company, Instrument Division, Buffalo 15, New York.

Micro particles of a refractive index and color similar to the medium in which they exist are not readily seen in the ordinary microscope bright field. Dark field microscopes are useful in medical, industrial and public health laboratories. One example is study of the spirochete of syphilis. In  $\times$  Dark Field microscopes these are made luminous and visible by a cone of light striking the specimen from all sides at an angle to avoid entering the objective.

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**BIOLOGY IN THE NEWS****Prevention and Care of Home Accidents and Childhood Diseases, *Parents Mag.*, April 1952, pp. 51-57.**

A manual, written for parents, which refers to the care of small children but which contains much information usable for older children as well. It is quite usable in units on health.

**Breeds of Cats** by Leon Whitney, D.V.M., *Good Housekeeping*, March 1952, pp. 184-188.

Basic facts about four common breeds of cats. The disposition of cats depends more on their parents than on their breed.

**The Changing Picture of Pneumonia** by Maxine Davis, *Good Housekeeping*, March 1952, pp. 13 & 168-170.

The sulfas and the antibiotics control most bacterial pneumonias but virus pneumonia still packs a wallop and had better be feared.

**Teacher Takes to the Woods** by Neil M. Clark, *Sat. Ev. Post*, March 8, 1952, pp. 22-23 & 124-130.

Summer camps can supplement the schooling of many city kids. How students take to the idea and a few of the educational experiences they have had form the basis for this article.

**John Burroughs, Disciple of Nature**, by Edwin W. Teale, *Coronet*, March 1952, pp. 90-94.

An interesting account of a man who saw the wonders of the commonplace things in his neighborhood and who was able to communicate that same live interest to others.

**Cattle Rush Down South** by Wm. A. Emerson, Jr., *Colliers*, April 5, 1952, pp. 26-26 & 68-70.

How pasture lands and cattle are replacing cotton on many Southern plantations; and the benefits resulting from diversified agriculture with cotton being grown only on the best adapted soils.

**Trout's World** by Prof. Wm. W. Michael and John Florea, *Colliers*, April 26, 1952, pp. 22-25.

How and what trout see. Young fishermen will enjoy this article.

**The Starling Nuisance: It's Driving Everybody Crazy** by J. C. Furnas, *Sat. Ev. Post*, April 26, 1952, pp. 30 & 138-140.

Starlings are useful but not in the numbers which come into our cities for the night. The noise they make and the damage caused by their droppings are nuisances which require immediate control. Suitable control methods are suggested.

**Careers in Saving Lives** by J. D. Ratcliff, *Woman's Home Companion*, April 1952, pp. 40-41 & 109.

A description of the role young girls play in the making of vaccines, testing drugs and vitamins and preparing other medicines necessary for the health of the people. May be useful in guiding some of the more intelligent girls into this responsible type of work.

**Loveliest Wilderness in the World** by Oden and Olivia Meeker, *Sat. Ev. Post*, April 19, 1952, pp. 24-25 & 136-140.

A short description of the history and the uses of London's 300 acre Kew Gardens. Since the destruction of the botanical gardens in Europe Kew is the best in the world as a place for scientific study of herbarium specimens.

**How Good Are the New TB Drugs?** by Steven M. Spencer, *Sat. Ev. Post*, April 5, 1952, pp. 26-27 & 109-112.

This is a description of the encouraging results of the use of synthetic derivatives of vitamin B—compounds of nicotinic acid—on patients far advanced as tuberculous. The compounds are helps but do not cure the disease. We still need sanatoria for adequate treatment.

**Smartest Bird That Tweets** by Greer Williams, *Sat. Ev. Post*, April 5, 1952, pp. 30 & 132-134.

Is the mocking bird the most intelligent of birds? The author's account of the antics of mocking birds as they sing, dance, fight and imitate various sounds would lead you to believe that they are.

**SCIENCE DIGEST**

A letter from Glenn Robinson, Assistant Circulation Manager of *Science Digest*, says in part: ". . . I have just seen a copy of your December 1951 issue with its excellent article on the use of periodicals in the science—particularly biology—classroom by Melvin A. Hintz and I'd like permission to quote from it in our promotion material . . . Seems to me that no better use could possibly be made of *Science Digest* and the other popular scientific magazines than the one Mr. Hintz has described and I'd like to see as many teachers as possible be made aware of it."

**NOTICE TO CONTRIBUTORS**

All full length articles intended for publication in *The American Biology Teacher* should be sent directly to the Assistant Editor-in-Chief, B. B. Vane, Daniel Kiser High School, Dayton 4, Ohio. News, notes, letters, and short items of all types should be sent to the Editor-in-Chief. If you want a copy of *Preparation of Manuscripts for Publication*, you may get it from the Editor-in-Chief, Assistant Editor-in-Chief or Secretary-Treasurer.

**REVIEWS**

HESSE, RICHARD, W. C. ALLEE and KARL P. SCHMIDT. *Ecological Animal Geography*. John Wiley & Sons, Inc., New York, 1951. xiii + 715 pp. illus. \$9.50.

This is the second edition prepared by Allee and Schmidt of *Ecological Animal Geography*, based on *Tiergeographie auf oekologischer Grundlage* by Richard Hesse (1924).

The book is divided into four main parts, which are further divided into twenty-eight chapters: Part I, Ecological Foundations of Zoogeography, including conditions of existence, environmental selection, classification, barriers to distribution, means of dispersal, geographic isolation, range, biotopes, biocoenoses, and historical zoogeography (pp. 3-165); Part II, Distribution of Marine Animals, with reference to physical conditions, chemistry, biotic divisions (Benthal, Pelagial), discussions of Abyssal Benthic and Pelagic Communities, and geographic divisions of animal communities of the sea (pp. 179-326); Part III, Distribution of Animals in Inland Waters (A Phase of Limnology), discussing environmental factors, and communities of running and standing inland waters (pp. 347-431); Part IV, Distribution of

Land Animals, including ecological factors, forest communities, grassland and desert communities, animal life of swamps and shores, Alpine animals, animals of polar regions, island communities, subterranean animal life, and the effect of man on the distribution of other animals (pp. 453-650).

There is a usable, well organized, 40-page index. The print is easy to read, printed on white, slick paper, 6×9 inch page size, covered with a good cloth binding. Some of the text in the second edition has been revised, and a simplified terminology makes it more understandable for the reader. The bibliographies at the end of the chapters have been expanded with more recent materials than were included in the first edition (1937).

The book is well illustrated with drawings, photographs, and graphs. The binomial system of classification is used exclusively with the common names of some animals given in addition to the scientific name.

In the opinion of this author, this book is a valuable reference and an excellent tool for the student of ecology and zoology, but is above the understanding and use of high school students.

KENNETH CLAYTON,  
State Teachers College,  
Emporia, Kansas

BROWN, A. W. A. *Insect Control by Chemicals*. John Wiley and Sons, Inc., New York. 817 pp. \$12.50.

The eleven chapters of Dr. Brown's extensive and technical work follow a logical sequence from the beginning discussions of the properties and chemical structure of individual insecticides to the section dealing with the balance of animal populations. The extent of his research is indicated by the citing of 2,300 references. The availability of these data in one well organized reference should be of great value to those interested in this field.

A good knowledge of organic chemistry is a prerequisite in understanding the first two chapters, which deal with the properties and molecular structure of modern insecticides. An example of this is the discussion of the

varying toxicity of DDT analogues obtained by the substitution of halogens other than chlorine on the benzene rings as well as the toxicity of structural isomers of DDT. The second section concentrates on the various modes of entry of poisons into the insect body and is followed by a survey of the modes of action of various insecticides. Application methods and equipment are studied with one chapter being devoted entirely to aerial application. The toxicity of insecticides to man, domestic animals, birds and plants are thoroughly investigated.

Chapters (9) and (10) are concerned with specific insects affecting plants and animals; the preferred insecticides being cited for use in various circumstances. The final chapter is a discussion of the relationship of insecticides to the balance of nature. The book contains numerous tables, with graphs and photographs being used frequently. An excellent cross-referenced index is provided.

VIRGIL E. BOATWRIGHT,  
State Teachers College,  
Emporia, Kansas

HAGAN, HAROLD R. *Embryology of the Viviparous Insects*. The Ronald Press Company, New York. pp. XIV + 472. illus. 1951. \$6.50.

This book reflects the highest standards of science research and writing. It is not surprising that the New York Academy of Science, recognizing the immediate and anticipated value of this book, honored Dr. Hagan with a prize award. The author's preface lists three intended functions of this work. They are: "as a text for the student entomologist, as a source book for the professional entomologist or general zoologist, and as a reference tool for public health and applied research workers."

The first section of this technical book discusses fundamental concepts, defines terms, and presents various plans, including the authors, for classifying viviparous insects. Thus, a background is developed for understanding the embryogenies of this particular group of animals. Part II summarizes the known embryological data pertaining to thirteen orders of hexapods. Basically, the text's

material has been selected from the author's knowledge of the subject. In turn, this information has been gained through many years of research. Facts, previously unpublished, are included. In addition, Dr. Hagan bridges a gap by compounding the scattered publications of other recognized authorities in this field. The discussion of each species or group under consideration begins with a historical approach. Suitable references to literature is cited for those who wish to delve deeper into this phase. This is followed by a review of the structure of the female insect's reproductive system, and a thorough account of the steps in the development of the embryo. The final chapter, an appraisal of viviparity, discusses modifications associated with viviparity, evolutionary trends toward viviparity, maternal solicitude, and the future of viviparity.

This well documented book is supported by numerous references, 160 illustrations, a twenty page bibliography of international references, and an index. Coverage of the subject is so thorough that the book is certain to stand for years as an authoritative reference on insect viviparity.

LEE R. YOTHERS,  
*High School,*  
*Rahway, New Jersey*

STANFORD, E. E. *Man and the Living World.*  
2nd ed. Macmillan Company, New York.  
xvi + 863 pp. illus. 1951. \$5.50.

In varying degrees of brevity *Man and the Living World* treats virtually all the sciences which supplement a course in general biology. Emphasis is on man, with respect to physiology, heredity, and the effects of micro-organisms on health. In use as a college text, such topics as the breeds of chickens, the gaits of horses, hydroponics, and the food habits of the cow are likely to be used as supplementary reading. Eighty-four pages are devoted to a survey of the animal kingdom and 66 to the plant kingdom. Dr. Stanford's style is formal but generally quite clear.

RICHARD F. TRUMP,  
*Senior High School,*  
*Ames, Iowa*

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Most issues of the American Biology Teacher, except those of 1938-39 and 1939-40, are available.

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